

## **REMARKS / ARGUMENTS**

### **I. General Remarks and Disposition of the Claims**

Please consider the application in view of the following remarks. Applicants thank the Examiner for her careful consideration of this application, including the references that Applicants have submitted in this application and, pursuant to Manual of Patent Examining Procedure (MPEP) § 609.02, all references submitted in the applications to which this application claims priority under 35 U.S.C. § 120.

At the time of the Office Action, claims 77-79, 81-87, 107-112, 187, 188, 190-196, and 198-220 were pending in this application. Claims 77-79, 81-87, 107-112, 187, 188, 190-196, and 198-220 were rejected in the Office Action. By this paper, claims 77, 81, 82, 83, 187, 190, 191, and 192 have been amended. No new matter has been added to the application in view of the claim amendments. All the amendments are made in a good faith effort to advance the prosecution on the merits of this case. It should not be assumed that the amendments made herein were made for reasons related to patentability. Applicants respectfully request that the above amendments be entered and further request reconsideration in light of the amendments and remarks contained herein.

### **II. Remarks Regarding Rejection of Claims Under 35 U.S.C. § 112**

Claims 77-79, 81-87, 107-112, 187, 188, 190-196, 198-203, 204, and 205 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. With respect to this rejection, the Office Action states:

Applicant has amended the claims to limit the recited hydrophobically-modified polymer to be “uncrosslinked”. However, no support has been found in the present specification for the recited hydrophobically-modified polymers to be not crosslinked (that is, for the term “uncrosslinked”).

(Office Action at 3.) Applicants respectfully disagree and assert that the specification as originally written provides sufficient support for the limitation of an uncrosslinked hydrophobically modified water-soluble polymer. However, for the sake of proceeding with the prosecution in a timely manner, Applicants have elected to amend the claim language of independent claims 77 and 187 and dependent claims 81, 82, 83, 190, 191, and 192 to delete the term “uncrosslinked.” Therefore, Applicants respectfully request the withdrawal of these

rejections. Applicants respectfully reserve the right to present claims directed to uncrosslinked hydrophobically modified water-soluble polymers in one or more continuing applications.

**III. Remarks Regarding Rejection of Claims 206-213 and 215-220 Under 35 U.S.C. § 102(b)**

Claims 206-213 and 215-220 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,532,052 issued to Weaver *et al.* (hereinafter "*Weaver*"). With respect to this rejection, the Office Action states:

Examiner notes that these new claims do not limit the hydrophobically-modified polymer to be crosslinked but do require the backbone of the polymer to contain an oxygen, sulfur or phosphorous atom.

Weaver had been discussed in previous actions and grounds of rejection therein are included herein for Applicant's convenience.

Weaver discloses a method for fracturing or acidizing a subterranean formation to substantially alter the fluid flow (permeability) and/or surface characteristics of the formation, said method including injecting into the formation an aqueous composition that can alter the properties of organic/aqueous fluids, said composition containing a branched water-soluble organic polymer containing unit(s), having a molecular weight of 900 to 50,000,000, that can be hydrophilic, hydrophobic or a combination thereof, and can further include a gelling agent and/or a proppant. (Abstract; col. 5, lines 1-10 and 30-65; col. 6, lines 29-65; col. 7, lines 7-33; col. 9, lines 32-37 and 49-63; col. 20, line 65 to col. 21, line 6; col. 21, lines 49-63; col. 38, lines 37-51; col. 39, lines 24-36; *See also*, Table 6 on col. 53-54 disclosing data of aqueous fluid diverting and water permeability reduction properties for an aqueous fluid containing a methoxypolyethylene oxide branched polydimethylaminoethyl methacrylate copolymer, sand, silica flour and bentonite)

For example, an exemplary polymer disclosed in Weaver for treating subterranean oil producing formations has a cationic hydrophilic backbone modified with hydrophobic branches providing a desired hydrophobic-hydrophilic within the formation, thus altering the surface characteristic of the formation and the fluid flow or resistance to flow relative to a particular fluid, wherein the hydrophilic nature of the branched polymer serves as an aqueous gelling agent that provides for an increase in fluid viscosity. (Col. 5, lines 11-16; col. 6, line 65 to col. 7, line 40; col. 7, line 63 to col. 8, line 21; col. 10, lines 56-59; Table on col. 9-10) In Tables 23-28, Weaver discloses data for examples of treating a

well by injecting into the well an aqueous solution containing a cationic polymer with nonionic branches.

**The water-soluble branched polymer can have, in its backbone chain and/or in its branch chain, one or more heteroatom or groups, such as nitrogen, oxygen, phosphorous, sulfur, sulfur groups, amide, carboxyamide and carbonyl. (Col. 14, lines 17-23 and 52-59)** The polymer units in either chain can be -R-X-, wherein R is a C1 to C6 alkyl radical and X represents a heteroatom and are preferably capped. (Col. 19, lines 36-65) Particularly, branched polymers containing polyamine and polyether linkages in the branches are preferred for altering fluid flow properties in the formation and are especially effective and stable at temperatures above 177°C. (Col. 13, lines 1-18)

Among the monomers disclosed in Weaver that can be used to form the branched polymer include dimethylaminoethyl methacrylate, acrylic esters, acrylamide, epichlorohydrin and chloroprene; wherein the polymeric unit/group can be derived from, e.g., saccharide or a derivative thereof (including cellulose and starch), vinyl, diallylic, amide or ether monomeric units, as long as it has the desired hydrophilic-hydrophobic property. (Col. 19, lines 7-10; col. 19, line 66 to col. 20, line 29; col. 22, lines 47-65) The vinyl or diene polymer units are represented by (Class I, structure on col. 23); the amine type polymer units (Class III, structure on col. 24-25); the amide type polymer units (Class IV, structure on col. 25); whereas the saccharide and saccharide derivative units (Class V) are represented by the chemical structure depicted on col. 25-26, lines 43-59. (*See also*, the examples of class V on col. 35-36)

Weaver further discloses that a preferred class of polymers for altering aqueous fluid properties, such as altering water-oil ratio in a formation process and enhancing oil production, are polymers containing 2-hydroxypropyl N,N dialkyl-amine as backbone units and acrylamide (organic acid derivative) and/or epichlorohydrin reacted polyalkoxide as the branch units. (Col. 42, lines 31-37) In Procedure 0 beginning on col. 50, line 5, Weaver discloses an example of altering the permeability of a formation surface (change in water-oil ratio) by injecting into the formation a copolymer of polydimethylaminoethyl methacrylate (PDMAEM having MW of 1 million) grafted with a polyethylene oxide branch (PEO, MW of 15,000). The resulting data showing reduction in water permeability of the formation is shown in Tables 7 and 8. (*See also* Tables 10-13 on col. 57-59 for permeability data of an aqueous treating solution containing 1% of a hydrophilic PDMAEM polymer (MW of 600-800K) branched with a hydrophobic methoxy-polyethylene glycol epichlorohydrin

(MPEO) adduct; particularly, polymer #7 of Table 10). In Tables 14-15 on col. 59, Weaver further discloses PDMAEM:PEO/MPEO weight ratios for the branched polymer ranging from 0.5:1.0 to 1.25 to 0.25.

Finally, regarding the limitation in independent claims 77 and 187 concerning the hydrophobically modified water-soluble polymer reducing the permeability of the subterranean formation to an aqueous-based fluid, Weaver discloses results demonstrating reduction in water permeability in the same examples containing the modified polymer discussed above (immediately preceding paragraph) in Tables 10-13 and 14-14 on col. 57-60. (*See, e.g.*, Sample #7 on Table 10, showing a reduction in water permeability of 85%)

Thus, the claims are anticipated by Weaver.

(Office Action at 4-7.)

Applicants respectfully disagree. Applicants respectfully submit that the cited reference does not disclose each and every limitation of claims 206-213 and 215-220 as required to anticipate these claims under 35 U.S.C. § 102(b). *See* MPEP § 2131.

In particular, with respect to independent claim 206, *Weaver* fails to disclose a hydrophobically modified polymer that “reduces the permeability of the subterranean formation to an aqueous-based fluid.” Although the Examiner has demonstrated that some of the fluids of *Weaver* may reduce the permeability of a subterranean formation to aqueous-based fluids, the Examiner has failed to demonstrate that *Weaver* discloses ***a hydrophobically modified polymer that reduces the permeability of a subterranean formation to aqueous-based fluids.***

The Examiner references Table 10-14 and claims that these tables disclose a hydrophobically modified polymer that reduces the permeability of a subterranean formation to aqueous-based fluids. However, Tables 10-14 of the *Weaver* reference do not demonstrate a hydrophobically modified water-soluble polymer reducing the permeability of the subterranean formation to aqueous-based fluids. *See Weaver*, col. 57-60. For example, Sample No. 7 in Table 10 of *Weaver* is not a hydrophobically modified polymer, in that it does not have a hydrophobic branch. *See Weaver*, col. 57. Rather, the Examiner has incorrectly referred to the methoxy-polyethylene glycol branch of Sample No. 7 as a hydrophobic branch. *See Weaver*, col. 57. Applicants respectfully submit that such branches are water-soluble, hydrophilic branches. As such Applicants maintain that Tables 10-14 of *Weaver* fail to demonstrate a **hydrophobically** modified water-soluble polymer that reduces the permeability of the subterranean formation to

aqueous-based fluids, but rather these Tables demonstrate that permeability reduction can be achieved by utilizing polymers with **hydrophilic** branches. *See Weaver*, col. 57-60.

Second, *Weaver* teaches that branched polymers containing a hydrophobic modifying portion function to **increase** water permeability. *See Weaver*, col. 7, lines 43-52. In particular, Applicants direct the Examiner's attention to the table contained in columns 9 and 10 of *Weaver*. *See Weaver*, col. 9-10. As set forth in this table, *Weaver* teaches that branched polymers including a hydrophobic modifying portion increase water permeability. *See id.* As such, *Weaver* clearly does not teach utilizing a hydrophobically modified water-soluble polymer to reduce the permeability of the subterranean formation to aqueous-based fluids.

Therefore, Applicants respectfully assert that independent claim 206 and its dependent claims are not anticipated by *Weaver*. Accordingly, Applicants respectfully request withdrawal of this rejection with respect to claims 206-213 and 215-220.

#### **IV. Remarks Regarding Rejection of Claims 210, 213, and 214 Under 35 U.S.C. § 103(a)**

Claims 210, 213, and 214 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Weaver* in view of U.S. Patent No. 6,358,889 issued to Waggenpack *et al.* (hereinafter "*Waggenpack*"). As set forth above, *Weaver* fails to disclose each and every element of independent claim 206. Nor has the Examiner provided any motivation to modify *Weaver* to teach these missing elements. Nor does *Waggenpack* teach these missing elements. Rather, the Examiner is merely relying on *Waggenpack* for its alleged teaching of a modified chitosan copolymer. (See Office Action at 8.) Accordingly, Applicants respectfully request the withdrawal of this rejection.

#### **V. Remarks Regarding Examiner's Response to Applicants' Arguments and Amendments**

In response to Applicants' arguments submitted on January 2, 2008, the Office Action States:

*The 35 U.S.C. 102 Rejection over Weaver (item 1 of FOA)*

Applicant's arguments presented in the Response regarding the captioned 35 U.S.C. 102 rejection of claim 77-86, 88, 107-112, 187-195 and 197-203 as anticipated by *Weaver* have fully been considered and deemed persuasive in view of the amendment to the independent claims in Response limiting the molecular weight of the polymer and the hydrophobically-modified polymer to be not crosslinked.

Examiner notes that this new limitation in the amended claims that limits the polymer to be “liner” has been reject, supra, under 35 U.S.C. 112, first paragraph, as containing new matter. If, in a subsequent amendment to these claims in response to this action, Applicant removes this limitation from the claims to overcome the aforementioned 35 U.S.C. 112, first paragraph, rejection, this rejection may be reinstituted (or a new rejection over *Dickson* and *Weaver* will be presented

(Office Action at 8-9.) While Applicants kindly thank the Examiner for withdrawing these rejections, Applicants respectfully disagree that a new rejection over *Dickson* and *Weaver* should be reinstituted if Applicants removed the limitation of “linear” from independent claims 77 and 187.

In order for a reference or combination of references to form the basis for a rejection under § 103(a), a *prima facie* case of obviousness must be established. Obviousness is determined by construing the scope of the prior art, identifying the differences between the claims and the prior art, determining the level of skill in the pertinent art at the time of the invention, and considering objective evidence present in the application indicating obviousness or nonobviousness. *Graham v. John Deere*, 383 U.S. 1, 17 (1966). Applicants respectfully submit that due to the differences between the claims as currently amended and the cited references the Examiner cannot establish a *prima facie* case of obviousness, in that the combination of *Dickson* and *Weaver* does not teach each and every recitation of the present claims.

As the Examiner stated in the Office Action, “*Dickson* does not teach hydrophobically-modified polymers having a molecular weight within the range recited in independent claims 77 and 187.” (Final Office Action at 9.) To the extent that *Dickson* may teach increasing the molecular weight of these polymers, Applicants respectfully submit that *Dickson* does not disclose increasing the molecular weight of the disclosed polymers to achieve the claimed molecular weight of 100,000 to 10,000,000. Furthermore, even if *Dickson* disclosed increasing the molecular weight of the disclosed polymers to achieve the claimed molecular weight of 100,000 to 10,000,000, *Dickson* still would not teach a hydrophobically modified polymer “formed from a reaction comprising a hydrophilic polymer and a hydrophobic compound or a polymerization reaction comprising a hydrophilic monomer and a hydrophobically modified hydrophilic monomer, wherein the hydrophobically modified water-

soluble polymer formed from the reaction or the polymerization reaction has a molecular weight in the range of about 100,000 to about 10,000,000” because, at most, *Dickson* only teaches increasing the molecular weight of polyamines by bridging two or more polyamine compounds after they are formed. *See Dickson*, col. 29, lines 13-18. As such, *Dickson* does not teach or suggest hydrophobically modified water-soluble polymers with molecular weights in the claimed range of about 100,000 to about 10,000,000.

Moreover, *Weaver* fails to render obvious the deficiencies of *Dickson*. As Applicants have previously demonstrated, there is no suggestion in *Weaver* to form use hydrophobically modified water-soluble polymers to reduce the permeability of a subterranean formation. Accordingly, the combination of *Dickson* and *Weaver* fails to disclose each and every limitation of the independent claims.

Therefore, Applicants respectfully assert that independent claims 77 and 187 are not obvious over *Dickson* in view of *Weaver*. Moreover, claims 78, 79, 81-87, 107-112, 188, 190-196, and 198-205 depend, either directly or indirectly, from independent claims 77 and 187. All these dependent claims include all the limitations of the independent claims from which they depend on, and thus are allowable for at least the reasons cited above with respect to independent claims 77 and 187. *See* 35 U.S.C. § 112 ¶ (2004). Therefore, Applicants respectfully assert that this rejection should not be reinstituted.

## **VI. No Waiver**

All of Applicants’ arguments and amendments are without prejudice or disclaimer. Additionally, Applicants have merely discussed example distinctions from the cited references. Other distinctions may exist, and Applicants reserve the right to discuss these additional distinctions in a later Response or on Appeal, if appropriate. By not responding to additional statements made by the Examiner, Applicants do not acquiesce to the Examiner’s additional statements, such as, for example, any statements relating to what would be obvious to a person of ordinary skill in the art.

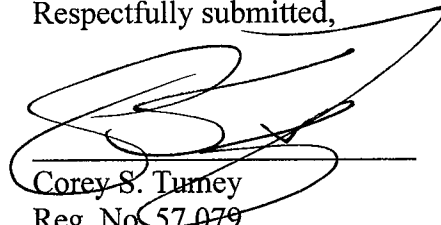
**SUMMARY AND PETITION  
FOR TWO MONTH EXTENSION OF TIME**

In light of the above remarks, Applicants respectfully submit that the application is now in condition for allowance, and earnestly solicit timely notice of the same. Should the Examiner have any questions, comments or suggestions in furtherance of the prosecution of this application, the Examiner is invited to contact the attorney of record by telephone, facsimile, or electronic mail.

Applicants hereby petition for a two-month extension of time to file this response under 37 C.F.R. § 1.136(a). The Commissioner has been authorized to debit the Deposit Account of Baker Botts L.L.P., Deposit Account No. 02-0383, Order Number 063718.0321 in the amount of \$460.00 under 37 C.F.R. § 1.17 (a)(2) for the two-month extension of time, extending the period for reply up to and including September 3, 2008.

Applicants believe that no other fees are due in association with the filing of this Response. However, should the Commissioner deem that any additional fees are due, including any fees for extensions of time, the Commissioner is authorized to debit Baker Botts L.L.P. Deposit Account No. 02-0383, Order No. 063718.0321, for any underpayment of fees that may be due in association with this filing.

Respectfully submitted,



Corey S. Tumey  
Reg. No. 57,079  
BAKER BOTTS, L.L.P.  
910 Louisiana Street  
Houston, Texas 77002-4995  
Telephone: 713.229.1812  
Facsimile: 713.229.2812  
Email: Corey.Tumey@bakerbotts.com

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